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10/565,942	07/12/2006	Katusmi Shibayama	468845450	8287
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BUDD, PAUL A				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/565,942

**Applicant(s)**

SHIBAYAMA, KATSUMI

**Examiner**

PAUL A. BUDD

**Art Unit**

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 September 2008.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.  
4a) Of the above claim(s) 12-15 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-9 is/are rejected.  
7) ☒ Claim(s) 10 and 11 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 26 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/SB/003)  
Paper No(s)/Mail Date 2/17/2006  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

***Election/Restrictions***

1. Claims **1-15** are pending in the instant application. Applicant's election without traverse of Group I, claims **1-11** in the reply filed on 2 September 2008 is acknowledged. The requirement is deemed proper and is therefore made FINAL.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim **1** recites the limitation "**the** second surface of the semiconductor substrate" in lines 5-6. There is insufficient antecedent basis for this limitation in the claim. Claim **1** recites the limitation "**the** first superficial surface layer" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim. Claim **1** recites the limitation "**the** outer edge portion" in line 5. There is insufficient antecedent basis for this limitation in the claim.

4. Claim **2** recites the limitation "the first surface of the semiconductor substrate" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim **2** will be examined as if the "the first surface of the semiconductor substrate" and the "the first **superficial** surface of the semiconductor substrate".

5. Claim **8** recites the limitation "the second **superficial** surface **layer**" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim. Claim **1** recites a "the second surface of the semiconductor substrate" but there is no equivalent second "layer" of any kind within claim **1**. It is unknown what element from claim **1** is being

claimed by "the second **superficial** surface **layer**". Additionally claim 8 recited "**the** outer edge portion of the semiconductor substrate". There is insufficient antecedent basis for this limitation in the claim. Claim 8 will be examines as "an outer edge portion of the semiconductor substrate".

6. Claim 9 recites the limitation "the second **superficial** surface **layer**" in line 4. There is insufficient antecedent basis for this limitation in the claim. Claim 1 recites a "the second surface of the semiconductor substrate" but there is no equivalent second "layer" of any kind within claim 1. It is unknown what element from claim 1 is being claimed by "the second **superficial** surface **layer**". Additionally claim 9 recited "**the** bottom portion of the recessed portion". There is insufficient antecedent basis for this limitation in the claim. Claim 9 will be examines as "a bottom portion of the recessed portion".

7. Claim 10 recites the limitation "**the** entire side surface of the semiconductor substrate" in line 3. There is insufficient antecedent basis for this limitation in the claim. Claim 10 will be examined as "**an** entire side surface of the semiconductor substrate".

8. Claim 11 recites the limitation "**the** thickness direction thereof". There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public

use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims **1-4, 6, 8 and 9** are rejected under 35 U.S.C. 102 (b) as being anticipated by Bandai et al. (Japanese Patent Publication number 08-111542 per IDS 2/17/2006).

Regarding claim **1**, Bandai discloses a back illuminated photodetector comprising:

a first conductive type semiconductor substrate [FIG.s 2, 7, 9, 11; element 2, "FZ", second substrate, p-type];

a second conductive type impurity semiconductor region [FIG.s 2, 7, 9, 11; element 16, n-type] provided in the first superficial surface layer [FIG.s 2, 7, 11; upper surface] of the semiconductor substrate [2];

a recessed portion [FIG.s 2, 11; opening 14, 6] for incidence of to-be-detected light formed in the second surface [FIG. 2, 11; bottom side] of the semiconductor substrate [2, "FZ"] and in an area opposite [per FIG.s 2 & 11] the impurity semiconductor region [16]; and

a window plate [FIG. 11; 4] bonded to the outer edge portion [4 meets 1] of the recessed portion [FIG. 2 ;14] in such a manner as to cover [see FIG.s] the recessed portion [14] to transmit the to-be-detected light.

Regarding claim **2**, Bandai discloses the back illuminated photodetector according to claim **1**, further comprising a supporting film [7] provided on the first surface [upper surface] of the semiconductor substrate [2] *to support* the semiconductor substrate. With regards to the limitation "*to support*", the functional language "*to support*" is subject to "In re Swinehart 169 USPQ 226 (CCPA)" where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on.

Regarding claim **3**, Bandai discloses the back illuminated photodetector according to claim **2**, further comprising a filling electrode [FIG. 2; 3a] penetrating through [per FIG. 2] the supporting film [7] and connected electrically [section 0015 the electrode 3a is for the n type layer 17 and thus electrically connected to the adjacent n type layer 16] to the impurity semiconductor region [16] at one end [either side] thereof.

Regarding claim **4**, Bandai discloses the back illuminated photodetector according to claim **1**, wherein the window plate [FIG. 11; 4; FIG. 24-25, 101a] is made of an optically transparent material [glass] and is bonded to the outer edge portion [as shown in FIG.s]

by anodic bonding {[Detailed Description of the Invention] section 0032 “anode joining method”; sections 0044-0045]}.

The embodiment of drawing 11 has a glass plate layer 4. The window plate of FIG. 24-25; 101a is bonded by means of anodic bonding [sections 0044-0055].

The limitation “is bonded to the outer edge portion *by anodic bonding*” is drawn to a process by which the product is made. Note that a “product by process” claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Marosi et al., 218 USPQ 289; and particularly In re Thorpe, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. The burden is on Applicant to show that the process necessarily results in structurally different product from that disclosed in the prior art.

Regarding claim 6, Bandai discloses the back illuminated photodetector according to claim 1, wherein the window plate [4, 101a] is bonded to the outer edge portion via a metal layer [Bandai’s [Detailed Description of the Invention] sections 0013; [Means]

section 0010-0011; [Function] section 0013; [Example] section 0044; "eutectic bonding"].

Regarding claim **8** *as best understood per 112 above*, Bandai discloses the back illuminated photodetector according to claim **1**, wherein a highly-doped impurity semiconductor layer [18] with impurities of the first conductive type [p] added thereto at a high concentration [p+] is provided in *the second superficial surface layer* [FZ] [18 p+] in the outer edge portion [to the side for element 18; Bandai's [Detailed Description of the Invention] section 0022] of the semiconductor substrate [2].

Regarding claim **9** *as best understood per 112 above*, Bandai discloses the back illuminated photodetector according to claim **1**, wherein a highly-doped impurity semiconductor layer [FIG. 1-5; 19] with impurities of the first conductive type [p] added thereto at a high concentration [p+] is provided in the bottom portion [per FIG.s] of the recessed portion within *the second superficial surface layer* [FZ] of the semiconductor substrate [2].

11. Claim **7** rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bandai et al. (Japanese Patent Publication number 08-111542 per IDS 2/17/2006).



Regarding claim 7 Bandai discloses all the limitations of claim 1. However Bandai does not disclose, "wherein a stepped portion is formed in a side surface of the semiconductor substrate or in a side surface of the window plate". In re Antonie 559 F.2d 618, 195 USPQ 6 (CCPA 1977), it is the position of the Office that providing a "stepped portion is formed in a side surface of the semiconductor substrate or in a side surface of the window plate" does not produce any unexpected results and that providing such steps in the side of the side surface is obvious and the result of obvious manufacturing processes.

***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bandai et al. (Japanese Patent Publication number 08-111542 per IDS 2/17/2006) in view of Derderian et al. (US Pat. Pub. 2008/0268563).

14. Regarding claims 5 Bandai discloses all the limitations of claim 1 and claim 4 as well as disclosing: and wherein the window plate [FIG. 11; 4: FIG. 24-25; 101a] is bonded to the outer edge portion [as shown] via a member containing alkali metal

[Bandai's [Detailed Description of the Invention] sections 0010, 0013, 0045; [Means] section 0010; [Function] section 0013; Example section 0044].

15. However Bandai does not teach, "wherein the optically transparent material is quartz". Derderian discloses an optically transparent material covering and bonded to an image sensor "wherein the optically transparent material is quartz", [FIG. 5, page 3, section 0035]. Bandai and Derderian are analogous art because they both disclose image sensors and surrounding/supporting/package structures attached to them. It would have been obvious to one of ordinary skill in the art at the time that the invention was made to use quartz as an optically transparent material for the motivation to use a "suitable material that is transmissive to the desired spectrum of radiation" [page 3 section 0035].

#### ***Allowable Subject Matter***

16. Claim **10,11** are objected to as being dependent upon a rejected base claim as well as minor 112 issues, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Budd whose telephone number 571-272-8796. The examiner can normally be reached on Monday to Friday 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Paul Budd/

/Jerome Jackson Jr./

Primary Examiner, Art Unit 2815